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## Rail-Road News.

### Inventor of the Tubular Bridge.

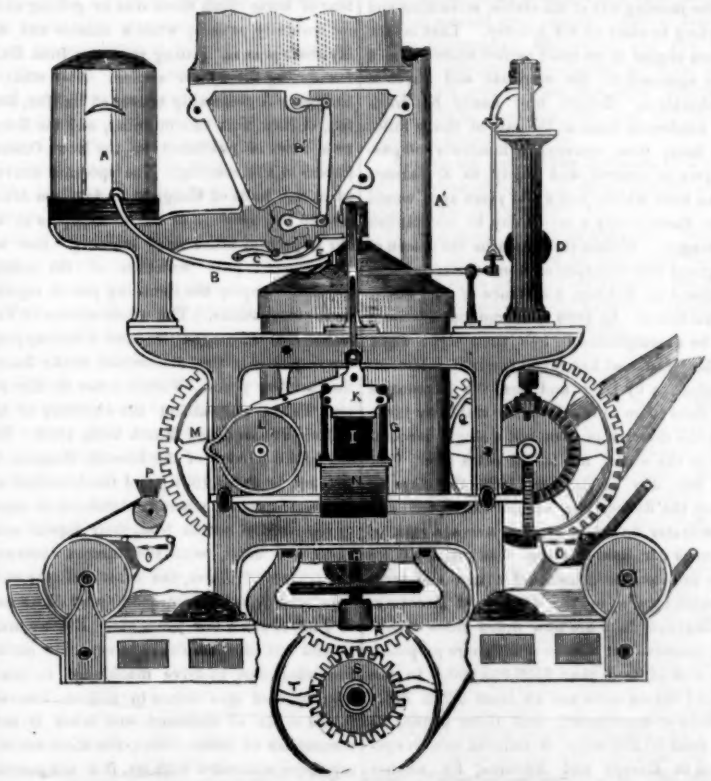
Almost every new discovery or invention has been claimed by more individuals than one. At present there is a keen controversy going on between Mr. Fairbairn and Mr. Stephenson, as to the Menai Bridge. We do not, in the meantime, give any opinion as to the respective claims of the two engineers. We believe that the idea of the practicability of a metal tube, as a roadway for locomotives, either as a bridge over a river, or as the lining of a tunnel beneath the bed of it, was suggested by James Petty, Esq., accountant in Edinburgh, in the beginning of 1845. Mr. Petty had the expense of such a tube for crossing the Tay calculated by an engineer in Dundee, and the result submitted to Mr. M'Farlane, of Perth. Mr. Petty's suggestion was communicated to Mr. Bateman (Mr. Fairbairn's son-in-law), and was discussed in a meeting of the Society of Civil Engineers, held in the house of Sir John Rennie in the month of March, 1845.

To Mr. Stephenson belongs the stupendous idea of spanning the Menai Straits by a tube, suggesting the egg shape as probably the most suitable form. To the practical abilities of Mr. William Fairbairn, of Manchester, with the assistance of Mr. Eaton Hodgkinson, professor at the University College, London, was confided the difficult experiment of ascertaining this momentous point. Long foiled in his arduous task, the indefatigable Fairbairn, acting on a suggestion of his friend, the late Mr. Smith, of Deanston, to use cells, top and bottom, to resist thrust and tension, (as at these points the fractures had invariably taken place), that gentleman has formed the successful structure, now one of the wonders of the world. From Mr. Smith was also gleaned the idea of the rivetting machine, since patented, four of which constructed the tubes, and a certain share of the patent premium was on this account assigned the deceased. It ought to be observed that a tube as a bridge and a lining for a tunnel, as suggested by Mr. Petty, are as different as day from night—the latter having a continuous foundation.—[Glasgow Daily Mail.

### New Project of a Railroad.

The Pottsville Miners' Journal says that preparations are making for an application to the Pennsylvania Legislature for a charter for a new railroad from that place to Philadelphia. It is estimated that the work can be done and the road equipped for about $7,000,000, to carry coal for one dollar per ton, and pay a handsome dividend to the stockholders. The proposition at present is to run the road on the opposite side of the Schuylkill, and to connect it with the Norristown road. A grant of two millions of acres of the public lands is to be asked for by the representative of the Congressional District, to aid the projected improvement.

## BREAD MAKING AND BAKING MACHINE.---Figure 1.



We here present engravings of a machine for mixing dough, cutting and baking it, all in one continuous operation. It is the invention of Messrs. Robinson & Lee, of Glasgow, Scotland, has been patented in England, and caused no small stir in London, Glasgow, and other cities, where it has been introduced.

Figure 1 is a front elevation of the loaf machine, complete for work; figure 2 is a front elevation of ovens and boiler; the boiler furnace and two of the ovens being represented in transverse section; and figure 3 is a sectional plan of the boiler, flues, and surcharging steam pipe. In connection with the machinery, the inventors do not use yeast to *raise* their bread, but aerated water, (water charged like soda water, with carbonic acid gas.) This water as a substitute for yeast, is contained in a fountain, A, on a bracket at the back of the machine. This fountain is supplied with the fluid from a separate reservoir, in such a manner as to maintain a uniform rate of pressure within it suitable for the exigencies of the machine, which derives its supply from it by the pipe, B. The flour-hopper is at B'; it has in it a horizontal spiked bar, or shaft, X, arranged to work with a compound movement, partly lateral and partly revolving, being connected by a crank and link to a second crank of similar size, carried on the end of the flour-feeding roller-shaft, X, so as to obtain the requisite movement for giving the flour in the hopper a light, even, and unintermittent delivery to the feed-roller. This roller is of wood, and is fluted or grooved, as represented by the dotted lines, and has a clearing wire, C, bearing against its under surface, to prevent the flour cohering.

**Figure 2.**

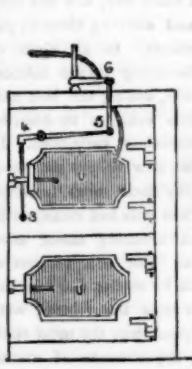
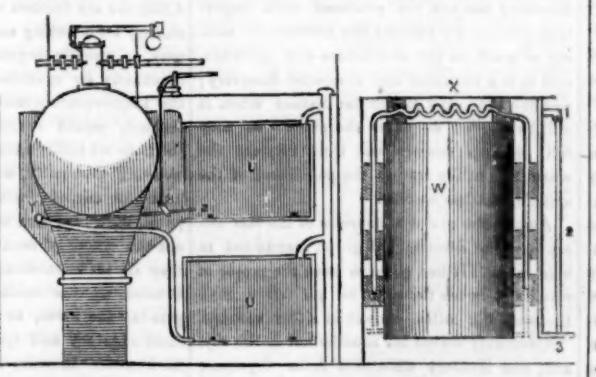


**Figure 3.**



For the regulation of the supply of materials, the governor, D, is used, its sliding ring at the top being made to act upon a horizontal spindle working a stop-cock in the end of the liquid supply-pipe, B. E is the mixing cone of hard wood, furnished with a cover, of galvanized iron, and having a scraper of the same material on its under surface to guide half-formed paste into the kneading-mill, or drum, G, which is a cylinder or drum of hard wood, 1½ inches thick, with twelve horizontal arms fixed in it at regular intervals, so as to allow the passage between them of similar arms on the kneading-shaft, H. This shaft is carried in top and bottom bearings, and works through a stuffing-box in the bottom of the drum, the mixing cone being keyed upon its upper end; its revolving arms are set at an angle of about 30° in an opposite direction to those on the drum. A short brass tube, I, is screwed to the side of the drum, over an aperture formed in the latter, as a port-hole for the escape of the dough, which, as it exudes, is cut off into pieces of the proper size for the intended loaves by the vertical sliding knife, K. This knife receives motion, at the required intervals, from a lever, carrying on its shorter end a stud working in a groove in the back of the cam, or guidewheel, L, the speed of which is capable of regulation by the change-wheels, M. On the delivery of the dough from the mill, it is conveyed by a wooden roller, N, to the moulding frame, O, the roller being driven at a slow rate by a worm gearing with a worm-wheel on the end of its shaft.

The moulding frame consists of a frame with two concave pulleys and an endless cloth, part of which last is removed in our engraving to show the lower gearing. The cloth is traversed by bands, or pitch-chains, upon the concave pulleys, beneath the dredging-box, P, in which a revolving circular brush keeps the cloth, and its piece of dough under conveyance, well dusted with flour. In the return movement of the cloth, it passes over a fixed block of wood, hollowed out on its upper side, to form, with the contour of the pulleys, a complete cylindrical opening, or passage. Through this passage the dough is conveyed, as represented by the arrows, being rolled or pressed in its transit into a ball or globe, ready for conveyance to the oven by the baking truck.

Instead of supplying flour from the hopper, a "half sponge," may be conveyed by the vertical tube, A. The gearing demands little explanation. The oblique shaft, A, worked from the gearing beneath the governor, drives the flour-feeding roller; the whole being put in motion by the main-pulley shaft, carrying a spur-wheel, S, gearing with the wheel, R, which runs at the rate of 30 revolutions per minute; at which velocity the machine will produce a ton and a half of a loaf-bread, or a ton of biscuit per hour.

The baking operation is carried on in steam-heated ovens, shown in fig. 2. The ovens, arranged four together, U U, are built up with a steam-boiler between the two pairs, one of the pairs being proving or rising chambers, into which the fermented or barm bread is first placed on commencing to bake. They are heated by flat rectangular steam chests, forming their top and bottom. The other pair are steam-ovens, heated by coiled pipes, as at X, which pass through the boiler furnace under a protective covering of fire-tiles, and are kept at a red heat. After the steam from the boiler, W, has heated the chambers in the first pair, it is passed through the coiled pipes, X, by which means it is surcharged with heat, without acquiring any additional pressure, and in that state is blown into the ovens—shown in section by the pipe, Y, having discharge branches, Z Z—acting directly upon the dough contained in them. To carry off the steam and vapor, trumpet-mouthed tubes are placed in the tops of the ovens, and in connection with an external vertical pipe, which conveys the discharge to a condensing receiver, where, when quite cold, the matter blown out is charged with carbonic acid gas, with the addition of salt, for the supply of aerated liquid fountain. To afford the necessary means of regulation of the heat of the ovens, a species of a heat-regulator is used. In the side of the oven next to the boiler are two brackets or studs, 1 and 2, into one of which a copper rod is securely fixed at its end, resting loosely in a collar in the other. This loose end projects through a hole in the oven front to a vertical lever, 3, connected to a second horizontal one, 4, and the expansion and contraction of the copper rod acts, through these movements, upon the index lever, 5, a link from which passes upwards to a bell-crank, acting upon a valve, 6, in the steam ingress valve.

# Miscellaneous.

### Progress of Discovery During the Last Half Century.

It is related that one of a party of travellers, while standing on one of the mountains of Switzerland, was so transported with the beauties of the scenery spread before him, that in a burst of enthusiasm he declared "he never had seen the equal of such scenery, and he was sure there was nothing like it in Europe, for he had travelled through every country in it." A German at his side said, "he had never seen its like with but a single exception," and he named a certain mountain in the Highlands of Scotland, which he had visited a few weeks before." The former gentleman hung down his head, merely remarking "that, although he had been on that mountain often, he never thought much about it." That mountain was on his own estate.

There is no common sayings which contain more truth than "familiarity begets indifference," "'tis distance lends enchantment to the view." We live in an age of wonders, and the last half century has witnessed a succession of the most mighty events and the most astounding discoveries which have ever been made, at least during any other such period of the world's history, and yet, living as we do, in the midst of such developments, with new leaves of the book of invention still turning over, we do not wonder—for it is just like human nature, that the majority of mankind are callous to the merits and importance of the discoveries made in their own day, even although they are reaping untold benefits from them.

Let us look back to the beginning of this century, and see what mighty works have been done by inventors since that time. In 1800 there was not a single steamboat in the world. Our inland seas and noble rivers were lying grand and silent in primeval loneliness, except when enlivened by the clumsy batteau, or the rude flatboat. In 1807 Fulton launched the Clermont, which made a passage to Albany in 32 hours. At that time the mode of travel was by schooners and sloops, which were frequently six days on the passage. The improvement was certainly great, but what would Fulton now say, to see steamboats running the same distance in 8 hours—and some of them large enough to stow the Clermont on their forward decks. No steamboat had broken the waters of the Mississippi previous to 1815; the voyage from Cincinnati to New Orleans was a tremendous undertaking, and occupied more time than a steamboat would now take to circumnavigate the globe. At present, it is calculated that there are no less than 3,000 steamboats of all sizes in America, and the time saved to travellers, by the invention of the steamboat, is at least seventy per cent.; that is, a person can travel a greater distance in 30 days now, by steamboat, than he could in 100 days in 1800. Just fancy Benjamin Franklin being almost wrecked in going from New York to Amboy, and the vessel in which he was in, occupying 32 hours on the passage—a distance which is accomplished every day by our steamboats in one and a half hours—a great change, truly.

In Europe, steamboats were unknown until 1811, and no sea was regularly navigated by steamboats until 1818. The progress of Marine Navigation is remarkable. In 1838 no steamship had ventured across the stormy Atlantic to establish ocean navigation. Now we have communication every week with Europe, by regular steam mails; and to show the advantage of steam over mere sailing vessels, within a few days from the present date, some of our finest sailing packets have come in after a passage of fifty days, while our steamships have not been out more than sixteen days. If the last half century had given us no other invention than the steamboat, that alone, considering its importance, is enough to immortalize it. If in 1800 there was no steamship in the wide world, where is the country now where they are not seen, and where they are not exercising a most important influence? No country in the world. On the Hudson, Mississippi, on all our lakes, rivers, and seas, and on all the oceans of the world. On that sea where the waters rolled up in walls to allow Moses and the Hebrews to pass dry shod; on the ancient Nile, where Cleopatra's galley spread its silken sails to the breeze; on the Ganges of Indus in the East, and the Sacramento in the West, there may be seen numerous monuments to the inventor of the steamboat,—the steamship "Rules the Waves."

The steamboat is not the only important invention of the last half century—the progress of invention is just as marked in other departments of discovery. Look at that Iron Horse moving out of his stable, screaming and panting to start on his journey. That is the steam engine in its most perfect state—it is a near approach to the spiritual and physical combination. Behold how easily he drags the ponderous train at the rate of thirty miles per hour, thus conveying hundreds of passengers in concert and safety, to a distance in an hour which, but a few years ago, would take them nearly a whole day to accomplish by stages. Within three months the Queen of England was transported from the interior of Scotland to London, a distance of 400 miles, in ten hours. In 1800 the same journey could not be accomplished in less than eight days. If the steamboat has revolutionized intercommunication by river and sea, the locomotive has done more to revolutionize travel by land. In 1800 there was was not a single locomotive in the world, nor for 29 years after, viz., the 6th day of October, 1829, the day on which the Rocket ran on the Liverpool and Manchester Railway, at the average rate of 15 miles per hour. From that moment we date the commencement of a new and most astonishing era in the history of discovery. In England there are now 5,600 miles of railway constructed, and as many more proposed, at a cost of more than $500,000,000. In the United States there are at least 5,700 miles of railway constructed, and there cannot be less than 20,250 miles of railroad now in operation in Europe and America, for neither Asia nor Africa can yet boast of a single line completed. What were the old Roman roads in comparison to the footpaths of our iron horses. In 1835 there were only 15 miles of railway in New York, now there are about 1,500, and a traveller can now journey as far in one day as he could in eight days in that year. The wealth invested in railroads is enormous, and their influence upon mankind, in every respect, is beyond calculation. But this grand invention is not the limit of the great discoveries made in our day.

Who, if he were told, twenty years ago, that the sunlight would be used for a limner's pencil, would have believed it? Not one; and yet this has been done. When M. Daguerre, a distinguished chemist of Paris, first published, in 1839, that he had discovered a method of taking pictures on metal plates by the sun; the public regarded his metal tablets with feelings of wonder. And if this discovery has not yet produced such important results, nor affected the customs of society so much as the steamships and railways, still it is a beautiful and wonderful discovery; and the time may not be far distant when it will be applied to paint the planets as they roll in their courses, and thus impress the warm kiss of the star on the pale cheek of the artist's metallic canvas.

Among the grand discoveries of the last half century, the Electric Telegraph stands out in bold relief. It has given to man the power of transmitting his thoughts to his fellow man thousands of miles distant in a few seconds. "Electricity leaves her thunderbolt in the sky, and, like Mercury dismissed from Olympus, acts as letter carrier and message boy." In 1837, when Morse first proclaimed that he could write messages by electricity at any distance, wise people shrugged their shoulders and looked with blank unbelief upon such a daring proposition; and when the proposal was before Congress, in 1843, to appropriate $30,000 to test his system of telegraphing, it met with some determined side cuts and stern opposition from men (and there are a great number in the world,) who are conservatives in nothing else but scientific discovery. In 1843 the first line of telegraph was completed in our country, between Washington and Baltimore, and since that time the progress of telegraph lines has been most surprising and astounding, if anything can now surprise us in the shape of discovery. All the important cities in our Union are linked together by the lightning tracks, and wherever we travel, there we behold, suspended on slender poles, those attenuated threads, along which the lightning fleets with messages of love, hope, gain, or fear. The telegraph has produced most astonishing changes in the modes of conducting business. A few years ago what a wear and tear of horse flesh there was in getting news for our daily papers; what a trouble and delay there was in getting the news from Halifax during the winter season. Now what a change. A steamship arrives at Halifax, Boston, or New York this morning, and the European news is published in the New Orleans papers in the evening. The speeches delivered in the halls of Congress to-day, are delivered to the readers of the newspapers in all our important cities next morning. Our astronomers, "pale watchers of the rolling spheres," employ the lightning pen to register their observations. The whole science of Voltaism, Electro-magnetism, and Electrotyping, are trophies of the discoveries made during the last fifty years. Volta's letter to Sir Joseph Banks, announcing the discovery of the Voltaic Pile, is dated March 20th, 1800. The splendid discovery of the Electro Magnet, by Oersted, is dated 1821; and the beautiful art of Electrotyping, whereby electricity is made to resolve the metals from their liquid solutions, and copy, with the utmost accuracy, the medals of Durer, the most delicate etchings, and even write in permanent characters of gold, is but a few years old. Electro-magnetism has been employed to separate metals from their ores, to drive machinery, to make huge bars of iron dance in mid-air, like the fabled coffin of Mahomet, and what it may accomplish in future times, (for there are still mysteries connected with it), it is not possible to predict.

Before the beginning of this century, what was the printing press in comparison to what it now is. A few years ago there was not a single printing press driven by steam, now there is not a paper with a large circulation printed without it. From printing 1,000, 2,000, and 4,000 copies per hour, the latest improved press can print 10,000, and the time is at hand when a single press will be throwing off 16,000 copies per hour. In other departments of typography the improvements have been equally striking and beneficial.

In what may be termed minor machines, the inventions and improvements have not been of minor importance. Fifteen years ago pins were all made by hand, each was made of more than one piece, and a number of persons were required to finish every one. A single machine now completes the operation from beginning to end; and, in Waterbury, Conn., 4,030,000 are finished every day, and the machinery for counting and sticking them in papers, is equally ingenious. In all kinds of machinery for manufacturing textile fabrics, the improvements made, during the last half century, would require volumes to describe them in all their numberless variations. In weaving, especially, we now behold the most beautiful carpets, with their most intricate patterns, woven by a few rods and cams, without the finger of man touching them, after they are set in motion. The rich carpets of Brussels are now made by steam, and iron fingers lap the wires, to raise the figures, with more accuracy and speed than the most skillful weaver. In some departments of manufacture, improvements have succeeded one another with such rapidity, that one set of machinery has been calculated to last only three years.

In Chemistry, what discoveries have been made; in fact, the whole science has been remodelled. The discovery of the voltaic battery was to chemistry what a strong man is to a great law-giver, in executing his mandates. In the hands of Davy, chemical compounds of what were supposed mere earthy crystals, were resolved into metals in 1808, and since that time the most astonishing progress has been made in the science.

Agricultural chemistry is but a few years old, and bromine, iodine, palladium, rhodium, &c., are discoveries of very late years. The Animal Chemistry of Liebig has been but recently given to the world; cotton and sawdust are now made to propel cannon balls, and rend rocks by a spark from a battery, and Chloroform has come to the aid of surgery, and arms and limbs are amputated from men and women every day, and they as ignorant of the operation performing on them as the dead in their graves.

Gas Light was unknown in 1800; it was not until two years after that Murdoch made his first public exhibition at Soho; since that time his discovery has encircled the earth,—in Europe and America all the principal cities are lighted with it, and even New Zealand villages,—where no white man had built his residence in 1800—are now illuminated by the same subtle but beautiful agent of human comfort and happiness. We have it asserted, also, and that but of yesterday, that water is now made in a New England city, at but little expense, to give both light and heat, to cold, blind, and erring mortals. In the department of Chemistry there is still as great an ocean before us as there is behind, in physical discovery.

In Astronomy the advancement has been equally rapid and wonderful. Mechanics has come to the aid of mathematics—new and powerful telescopes have drawn the stars down to earth, and opened up the secret chambers of Orion to the ken of mortals, and so refined have the disquisitions of philosophy become, that the planet Neptune was recently discovered, even before a ray of its light had entered human eye; and, as Sir David Brewster has well observed, "by a law of the Solar System, just discovered by Daniel Kirkwood, an humble American mechanic, who, like Kepler, struggled to find something new among the arithmetical relations of the planetary elements, we can determine the broken magnitude of the original planet, long after it had been shivered to atoms."

There is not a single department in science and art but has been greatly enriched with splendid discoveries during the last fifty years; and those discoveries, although so many are blind to their value, have been the means of conferring great benefits upon all classes. Look at the simple article of Lucifer Matches; twenty years ago we knew nothing about their benefits. None but those who were comparatively rich could buy them, and fifteen years ago a box, which now sells for one cent, could not be purchased for less than twelve cents. During the last war between America and England, cotton cloth, which now can be purchased for eight cents, could not be purchased for forty. Blanchard has given to the world a machine which, by putting a rough block of marble upon a spindle, soon turns it into the likeness of Clay or Webster. Bogardus has given to the world his engraving machine (we are sorry that it is so little known) which can engrave the finest numbers, and the most beautiful flowers, on metal, with a facility and accuracy, which baffles all manual workmanship. In planing machines, spike machines, machinery for making shoes for men, and shoes for horses; in machines for making all instruments, from a needle to an anchor, what part of the whole world's history can equal the last half century? Nasmyth's Steam Hammer, which was invented but a few years ago, can be managed with the docility of a lamb. We have now gold and steel quills instead of goose quills. This is certainly the age of invention. The triumphs of warriors are naught compared with the triumphs of inventors. The iron bridge spanning the sea, the iron ship sailing on the sea, are greater evidences of mental power than Austerlitz or Waterloo.

And if the last half century has given birth to so many grand discoveries and inventions, is there any reason to doubt that the future may more than outstrip the past? We can see none. Hope is pointing her finger to the year 1900.

**English Cheap Plated Works.**

The plating is of various qualities, and there are various frauds connected with its manufacture. The Birmingham ware has a thin coating of good gold, the London ware is thicker, but of an inferior quality.

The following is the plan adopted by the Birmingham platers:—A piece or plate of yellow brass (say an inch in thickness, and of any length and breadth the manufacturer may require) is planished (i. e., hammered flat and smooth), then filed until no mark of oxidation or impurity remains upon its surface; it is then carefully rubbed over with borax mixed with water, which treatment preserves the surface of the metal during the heating operation. A piece of gold, varying in thickness according to the quality of plating required (but to make it pretty good, the gold should be at least 1-10th the thickness of the brass,) is then fastened on the surface of the brass by means of clamps (pieces of iron plate so constructed as to bind both metals together to prevent warping); the two metals, thus confined together, are put into a furnace, and heat applied until the gold or alloy of gold, being more easily fused than the brass, or also by the aid of the borax flux intervening between the two plates, becomes fused, or soldered to the other; the clamps are removed, and the two now united plates, viz., gold and brass, are cleaned by means of dilute sulphuric acid, afterwards rubbed with sand to remove any oxide or other objectionable matter that might interfere with its smoothness of surface. The sheet is then passed between rollers (occasionally annealing to soften it after the action of the rollers), until it is of the requisite thickness. The gold is of good quality, otherwise the fusing of its surface to that of the brass would be attended with the probability of a disunion of its particles, in which case it would not be sufficiently ductile to permit of its extension without separating from the brass, so that it is more economical to use a better alloy of gold, about 18 carats, than to run the risk of employing an inferior alloy, where failure in the result would be more probable, especially as the good gold, being more malleable and softer, corresponds better with the comparatively soft nature of the brass; so that the two metals or alloys of metals, when united, roll well together. When rolled down to a certain thinness, it is worked nearly by the same methods as if it were all one metal —always taking care to expose the "best side out." By this system articles are made which at first present the appearance of gold to the ordinary observer, but which are only brass articles, with a pellicle of gold on the surface—in many instances as thin as gold leaf. This soon discovers itself to the purchaser, who has no alternative but to get the otherwise useless ornament gilt. This kind of goods is made in immense quantities in Birmingham,—their cheapness, except where *very* gross imposition is practised, being the inducement held out to purchasers.

In London manufactories, the system is both different in process and in the purposes to which it is applied; it is usually employed for the purpose of giving artificial strength, where the price would not be sufficient to remunerate the manufacturer if he used all gold of a proper thickness for his purpose. In the first place, the gold used is not so good in quality (about 12 carats, or one-third less in value than that used by the Birmingham platers). Secondly; it is not united by fusing the alloy of gold on the surface of the brass; but by soldering the two plates together with silver solder. And thirdly, the gold used does not form less than one-third of the entire substance when rolled, and, instead of being, like the Birmingham plating, perhaps 1-17th gold to 1 of brass, it is only two brass to 1 gold, so that were it not for the purpose of additional strength, it would be scarcely worth while to take the trouble of plating for the slight advantage gained. The London workman's method of plating is as follows:—He takes a piece of gold of the thickness of 1-16th of an inch, and any size, superficially, that he may require for the work about to be manufactured; he cleans one side in the manner above described; then he takes a piece of brass, of the same superficial size, but of ¼th of an inch in thickness, the surface of which is also cleaned and prepared with borax; then a piece of silver solder of the same size, but rolled until it is not thicker than paper, is carefully cleaned and boraxed, and the three metals are then tied together with strong iron wire to prevent warping, the solder, of course, intervening between the sheets of gold and brass; heat is then applied (usually by the blowpipe), until the solder, in consequence of its easy fusibility, "runs" or melts, thus uniting the gold and brass together. The sheet is then rolled to the thinness required, and it may be used for almost the same purposes as gold itself. The manufacture of plated work is, to the goldsmith, a labor of difficulty, as all the edges of the article, when finished, must be so contrived as to be entirely covered by a gold surface, otherwise, whenever a section occurred, the base metal would be perceptible; this object is attained by filing away the brass at the inner angles of the juncture in a similar manner to that in which veneered work is joined by cabinet makers. The process of making plated jewelry may be considered a kind of veneering with metals; and the art has been brought to great perfection, as many excellent workmen have been deceived by mistaking a well-plated London-made article for a solid gold one. Another system is practised to a great extent, by which a large article of jewelry may be made to appear very heavy, and, seemingly solid, with a very small amount of gold. A thin plate of gold is "struck up" into any form required, in a steel die; this hollow shell is then filled by fusing into its cavity a quantity of silver solder; a corresponding half is then affixed, also filled in the same way, and heat applied until the solder runs: the two halves are thus firmly united, and the whole appears one heavy mass of gold. It was by this plan that the old fashioned watch seals were made, too often leading the wearer to suppose that, by their ponderousness, they were very valuable.

For the Scientific American.

**Steamboat Explosions and the Law.**

Let me indulge myself a few moments in writing the thoughts which arose in my mind after hearing of the explosion of the Knoxville.

I asked of myself the cause of the inefficiency of the Act of Congress, passed in 1838, "to provide for the better security of the lives of passengers on board of" steamboats? It struck me at once that the main defect of the law was in conferring upon the Federal Judges the authority of appointing the Inspectors. Firstly, the judges generally lack the knowledge and experience necessary to enable them to make a proper selection, though, no doubt, they all desire, sincerely and honestly, to do their duty. Secondly, the appointment once made, the judges necessarily lose sight of the man upon whom their favor has fallen; that is to say, so far as the performance of the duties are concerned, for I suppose that, of course, the amenities of friendly intercourse are continued between the patron and his client. Thirdly, the appointing power is divided, and exercised in different parts of the Union by different men, who have no control over each other, and little or no intercourse. This is the main objection to the law. All concert, all unity of action, all tendency to the attainment of a general good is prevented and lost. A steamboat which cannot pass muster in one port, frequently gets a certificate in another. No standard of quality can be adopted; what requirements should constitute a safe boat, cannot be settled; no progress can be made in the rules of inspection and licensing, so as to keep up with the improvements and discoveries of the age. The agents of authority each act in their separate sphere, according to no common test of excellence or quality, but according to the lights they respectively possess. I am confident that the Act of Congress has done little or nothing for the safety of persons or property.

Now, is seems to me, the appointing power should be *a unit*, controlled, if you please, by a board, and that it should be confided to a man of practical and theoretical knowledge in mechanics; one who has constant opportunities of obtaining information in relation to steam engines, navigation, explosions, manufacture of machinery—one who has time and ability to watch over the manner in which the Inspectors perform their duties. I would have this officer vested with power to issue instructions to the inspectors in relation to tests, as well as in relation to the standard of qualities to be required for the granting of the certificate; that he should make inquiries into the causes and statistics of explosions, and the means of preventing the evils complained of. He should also report to Congress, and suggest such modifications as experience and the progress of science may require. Add to this the power of removing inspectors, and you will have an efficient law—better at least than the present one—a law, the good effects of which will be soon felt from one end of the Union to the other.

As it is, we are, to say the least, in a state of powerless *statu quo*, so far as steamboat explosions are concerned.

In conclusion, I suggest that the Commissioner of patents would be the proper officer; but, be that as it may, I insist upon the main idea above expressed. YANKEE CREOLE.

New Orleans, Dec. 21, 1850.

**Baths and Laundries in London.**

In London, although there is much destitution, still, we believe, there are more excellent charitable institutions in it than in any other city in the world. The St. Martin's Baths and Laundries is a building behind the National Gallery, and is very handsome, being in the Tudor style.

The edifice may be generally described as consisting of three stories—a sunken basement in the boiler-house, with machinery which supplies cold water to the boilers, and distributes cold water, hot water, and steam, to the whole building. Hot air is supplied from a separate source. A tall tower-chimney at the top completes the arrangement to secure a managable draught, available for purposes of ventilation and drying. At the top of the house is the residence of the manager. The water is the limpid element supplied by the Artesian well on the spot—a flood of brilliant crystal.

The baths are seventy in number; about eighteen are set apart for women; about one-third are parted from the rest and used as "first class" baths; the second class baths have a separate entrance, and are in a separate portion of the building. In the first class, each bath-room contains a bath, looking-glass, chair, shelf, foot-trellis and carpet, and other conveniences; the bather is allowed two towels, hair-gloves, &c.; the charge is sixpence for a warm bath, threepence for a cold one. The arrangements for filling and emptying the baths are excellent, the hot or cold water bubbles up from one end, and the bath is filled in a few seconds; it is emptied as rapidly. The water once admitted to the bath *cannot* be used again; but after one washing it runs into the main sewer, and contributes to a powerful "flushing" of that drain. In the second class the arrangements are almost the same, except that the bather has only one towel, and has no carpet or trellis; the charge is twopence for a warm bath, a penny for a cold one.

The number of boxes for washing clothes is fifty-six, each with its ironing box beside it. The washing box contains a boiler, equivalent to the "copper," supplied with warm and cold water from a turncock; the boiler has a moveable wooden cover, and the water is made to boil by the admission of steam. Next to the boiler is the washing tub. Fitted to the wall, above the height of the washer, is a sort of broad, shallow cupboard, of which the bottom opens downwards, and from it is pulled down a clothes horse; the clothes are hung upon this horse, it is raised again by balance-pulleys, and enclosed in the cupboard; hot air, of regulated temperature, is admitted, and let off loaded with moisture, at intervals; and in a few minutes the clothes are effectually dried. The ironing boxes, each contiguous to its washing box, form a separate range, shut off from the moist washing place by doors. A stove heats the irons. The supply of water is unlimited. The charge for each washing box, with its accompanying conveniences, is one penny for the first hour, two-pence for the second, three-pence for the third and each subsequent hour.

The baths were opened in Jan. last, (1850) and the demand has exceeded every estimate. Immense numbers are waiting to take their turn. Persons of all conditions use the baths —from common laborers to men who must be be called "gentlemen" in ever respect of feeling, wealth, and social station. The total number admitted last week was 4,083; the total number from the 24th January to Saturday last was 154,000.

The second class baths do not "pay"—that is, the cost of the bath exceeds the price charged; the first class baths return a compensating profit, with a surplus. It is calculated that the first hour, for which one penny is charged to the washer, will not "pay," and three-pence for the third hour will only compensate the loss on the first. The object of the scale, which may still be revised, is to check waste of time in dawdling—to admit as many as possible, and to secure *some* use of the laundry for the very poorest. The servants of the establishment of course are paid; but the managers acting for the parish receive no emolument, enjoy no privilege—paying for their baths like the rest of the public. Any surplus revenue must, by the act of Parliament, go in diminution of the poor-rates

[Such an Institution in New York would be of great benefit to thousands of our population.

**Composition of Materials Employed in the Manufacture of Porcelain in China.**

The following paper was read before the Academy of Sciences, by M. Ebelman, Director of the Government Porcelain Works:—

All the materials employed in the manufacture of porcelain, are stones obtained either from the soil or detached from rocks, excepting the materials Kao-ling, of Tong-kang, and of Ly-kang, which are obtained from the soil like sand, the grosser particles being removed by treatment with water; the soft parts being reserved for use. All the stony materials should be well levigated, then thrown into water, and well stirred, so as to allow the grosser particles to precipitate; the finer particles, which float in the water, are collected, dried, and formed into cakes. All these parts are carried to King-te-ching, and are kept in the houses of the workmen previous to use; they are then mixed with water, passed through a a sieve to remove any small particles, and slightly dried; they are now ready for use.

The Kaolins and the Petuntse, which are employed in the manufacture of pastes for Chinese porcelain, are analogous in chemical composition to that of the materials employed to answer the same purpose in the European manufacture of porcelain. The Kaolins of China evidently proceed from the disintegration and decomposition of granitic rocks. The chemical composition of the Petuntse is very nearly allied to the mean composition of the Limousin pegmatite, but the mineralogical characteristics of the Petuntse identify them with the composition or petrosilicious *felspar*.

The mechanical preparation of the materials employed in the manufacture of the pastes, appear to be based on the same methods as are employed in Europe.

The Chinese porcelain pastes, are somewhat more fusible than those made in Europe.

The glaze of the Chinese porcelain is much more fusible than that of European porcelain. This increased fusibility is due to the addition of lime in somewhat larger proportion to the Petuntse, or petrosilicious felspar, which is alone used in the manufacture of French porcelain.

The green tint of the Chinese porcelains appears also to be due to this employment of lime. Everything indicates that the Chinese porcelains are baked at a much lower temperature than that found to be necessary at Sevres, and other porcelain works in France. The Chinese porcelain has from time immemorial furnished the type of hard porcelains.

London has been afflicted with dense fogs, lately.

# New Inventions.

### Improved Blowing Machine.

Mr. Solomon W. Ruggles of Hartford, Conn., has invented and taken measures to secure a very good improvement in Blowing Machines. The blades of the blower are made with side flanges and concave or shovel faces, and above the circle box in which the fan revolves, there is a circular chamber between the roof of the fan box and the outside casing. From the fan box to this chamber there are a succession of leading spouts or ways branching off at tangents from the circle box. When the fan revolves, the air is driven rapidly into the circular chamber spoken of, out of the fan chamber, through the ways spoken of, thus preventing the air from accumulating with a back pressure on the fan blades, and consequently obviating the side lapping of the air on the back of the blades. The air passes from the outer chamber to the forge or fire. This blower has been tried in the place of one of the old kind, and its performance has astonished all those who are acquainted with its action, and the action of the blower it has supplanted.

### Patent Troubles---Friction Matches.

"A good many years ago," say the Springfield, (Mass.) Republican, "A. D. Philips, then of this town, secured Letters Patent on the invention of friction matches. The patent, however, came to be regarded as a dead letter, and everybody made and sold friction matches, in any quantity. Recently, the patent has been assigned to some Boston gentlemen, and they have given issue to demands upon manufacturers and venders, in this State, and these demands have been, in some cases, paid. Individuals in Springfield, who have sold friction matches, have, under a threat of suit for damages forked over $25 each, that being the sum uniformly demanded of traders, as a compensation for their infringement.

An action has been commenced against H. E. Pierce, a manufacturer of matches in Charlemont, in the U. S. Circuit Court, at Boston, which will be tried in January. In the meantime, the Court has issued a temporary injunction upon his manufacture. The action is brought by E. Bryan and others, and they are probably the assignees of Mr. Philips' patent. We understand that it will be shown, in defence, that the friction match was the simultaneous invention of quite a number of individuals, one of whom, at least is now a resident of Springfield. Such, at any rate, is said to be the fact, but we are not enough conversant with patent laws to decide upon its weight in such a case as this.

Matches have now become one of the necessaries of life, and the exaction of tribute for their sale would be a tax as universally felt as a direct tax on bread. Their manufacture, not only for domestic use, but for export, has become an important branch of business in many parts of the country. An enormous quantity are manufactured in New York."

The following letter relates to this patent:

PATENT OFFICE, Jan. 6th, 1851.

GENTLEMEN—Agreeably to your request of the 3rd inst., I have to inform you that the patent issued to A. D. Phillips, on the 24th Oct., 1836, was extended to his administrator, E. T. Swift, seven years from the 24th Oct. 1850. No Re-issue was granted. I am, respectfully, yours, &c., THOS. EWBANK.

Messrs. Munn & Co.

### Extension of Patents Applied for.

FIGURE LOOM.—Edson Fessendon, conservator of the person and property of William Crompton, a lunatic, in Hartford, late of Taunton, Mass., has applied for the extension of a patent granted to the said Crompton, for an improvement on figure power looms. The patent expires on the 25th of next November.

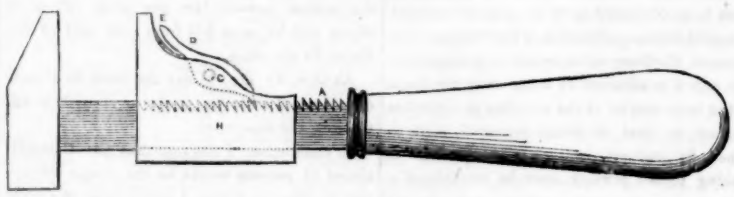
This petition will be heard at the Patent Office on the 24th of next March, at 12 M. All persons opposed to the extension must appear and show cause why it should not be granted.

FIRE ARMS.—O. W. Whittier, of Concord, N. H., has petitioned for the extension of his patent, granted 30th May, 1837, for an improvement on Fire Arms. This petition will be heard at the Patent Office on the 17th of next March at 12 M.

### Successful Result of Arsenic in the Case of Pleuro-Pneumonia.

As we hear still of several losing their cattle from distemper, many being ignorant of, or afraid to adopt the remedy which Mr. Shephard has kindly made known through the columns of your paper, I take the liberty, according to my promise, of giving the details pursued by my steward in one of the worst cases which I have seen. On perceiving the first symptoms, he bled the cow until signs of exhaustion were apparent; then administered twelve grains of arsenic in a little soft sugar, at intervals of three hours, washing the mouth occasionally with nitric acid, and also the hoofs, from which there was a great running. After the expiration of forty-eight hours, he made her swallow about a pint of oatmeal gruel, and on the following day he gave a mash of boiled turnips and beans, continuing these mashes for about a week, when she was able to eat some cut grass, and soon after became perfectly well. I may mention, as it is not generally known, that both pigs and poultry are liable to catch this disease, so that caution should be observed in removing the bedding of affected animals out of their reach. —[Farmers' Gazette, England.

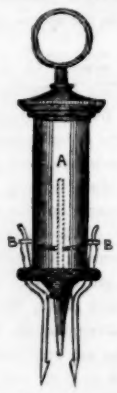
## NEW WRENCH.




The accompanying engraving represents a wrench, with an improvement on it made by J. W. Hargrave, of Lowell, N. C. It requires but little description, as it will at once be understood by all who look upon it. Instead of a screw upon the shank, and a thread inside of the under jaw working on it, there are ratchet teeth, A, in the front of the shank, and there is a pall, D, on the under jaw, E, which moves on a centre-pin, C, with a spring under it to keep the pall in the rack. This constitutes the improvement; it is easily and quickly changed for large or small nut, and on the whole, appears to us in a very favorable light.

### Ear Syringe.

Some time ago we noticed, in a cotemporary, a letter from a correspondent, stating that he was relieved from temporary deafness by inserting a pair of very small iron tongs into the orifice of his ear, and then gently expanding the legs of them. This was practised regularly every morning for two weeks. This view is a syringe, having two levers or forceps, which can be brought very close together at the points. These are inserted into the entrance of the orifice of the ear, and then by pressing upon the lever, A, seen by dotted lines, the legs, B B, expand, and open the orifice of the ear. The bent levers are fixed on




centre pins at the lower flange of the cylinder, consequently, by pressing the short ends inwards, the outer prongs expand. Any substance for washing the ears may be used, such as cold weak soap suds. The ear is a member which should be very gently dealt with. It is not prudent to use any hot solution for cleansing the ear.

### Mineral Riches of Arkansas.

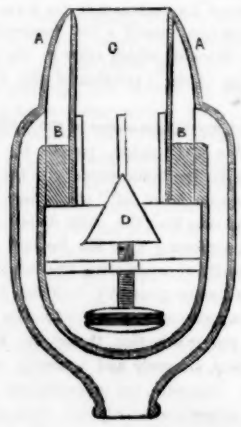
A Mr. Snell, an accomplished chemist and mineralogist, who has lately been exploring the mineralogical treasures of Arkansas, says he found in the interior and mountainous regions of the state abundant indications of mineral and metallic wealth. He collected a large number of specimens of silver, iron, lead, copper and zinc, and he reports having seen indications that some of these metals exist in great quantities, and that veins may be worked with much advantage. He also discovered signs of extensive coal beds, the strata in some places being quite thick, and the quality of the coal is said to be a similar to that of Pittsburg, and equal to it in combustibility and caloric power.

Twenty-five sail of vessels are now due at this port from Europe. The weather has been very severe.

### New Gas Burner.

This is an improved Gas Burner, recently patented in England by George Michiels, of London. The quantity of gas issuing from the burner is increased or diminished at pleasure. The gas issues in the form of a circular ring, and not a series of apertures as usual. The means of regulating the quantity of atmospheric air is provided for, and is admitted into the interior of the flame.

The accompanying engraving is a representation of the burner. A is the exterior of it; at the upper part it is circular in form, and at




the lower part cylindrical; the outer part is soldered to the ring, B, and the inner to C of the burner which is cylindrical and which is also attached to the ring, B, by means of a fine threaded screw, so that it can be raised or depressed, and thereby cause the upper edge of the inner cylindrical part to approach to or recede from the upper edge of the outer part, A. The inner part, C, can be raised or lowered by means of a key. The cone, D, can be raised or lowered by means of a screw, to which it is attached, passing through a bridge fixed to the stem of the burner, so as to adjust and regulate the quantity of atmospheric air admitted to the interior of the burner. This is allowed to be a very important consideration as a good light—complete combustion of the gas—depends on a requisite supply of atmospheric air to the burner, so as to supply, if possible, the interior of the flame. It was upon this principle that Bude made his first experiments and great improvements.

The celebrated vase, in the gallery of the Vatican at Rome, supposed to be that containing the ashes of the sons of Germanicus—some say of Augustus—was recently thrown from its pedestal, by the falling of a window, driven in by a fierce gale.

### Post Office Statistics.

We are indebted to W. V. Brady, Esq., P. M., for the accompanying Post Office statistics for the quarter ending Dec. 31st, 1850:—

| | | | |
|---|---|---|---|
| California | Letters | received, | 123,912 |
| Foreign | do. | do. | 340,402 |
| California | do. | sent, | 127,048 |
| Foreign | do. | do. | 353,454 |
| Total, | . | . . . | 944,816 |

To this add the daily average of domestic correspondence, of say 50,000 letters, and the amount of letters received and sent by transient vessels, and it will give 6,037,000 letters that have passed through this office in the last quarter.

The number of Foreign Newspapers for the quarter is as follows:—Received 169,233 and sent 316,068, amounting to 495,301.

The amount of letters advertised in the quarter, was 37,942, one-third of which have been called for and delivered to the rightful owners.

From the above statement our readers can form some idea of the vast amount of business done regularly through the New York Post Office.

### Statistics of New York.

The total number of vessels at present on the stocks, or launched during the year, was 77, whose aggregate tonnage is 89,741; of this amount, 62,225 tons have been launched, and 27,216 tons remain to be launched.—Nineteen of these vessels are steamships, 24 steamboats, 3 propellers, 28 ships, 4 schooners, and 9 ferry boats.

The number of new buildings erected duting the year 1850 was 1,912.

The deaths including still-born, were 16,954, a ratio of 1 to 32·50.

The arrival of emigrants for the year was 234,620, of which 220,788 were aliens, and 13,932 citizens from foreign ports.

There were 2,705 convicted of various crimes.

There are 4,741 persons in various offices.

### The African Exploring Expedition.

We have received intelligence from the Saharan African Expedition up to the 29th of August last.

The expedition had literally fought its way up to Selonfeet in Aheer, near to the territory of the Kailouee Prince, En-Nour, to whom it is recommended.

Mr. Richardson had been obliged to ransom his life and those of his fellow travellers twice. The whole of the population of the Northern districts of Aheer had been raised against the expedition, joined by all the bandits and robbers who infest that region of the Sahara.

The travellers are now in comparative security. It has been a tremendous undertaking for them to force their way among tribes who had never seen the face of a Christian, and who look upon Christians as the declared enemies of God.

The great Soudan route, from Ghat to Aheer, is now explored.—[London Times.

### Eclipses for 1851.

There will be four eclipses in 1851,—two of the sun and two of the moon. A partial eclipse of the moon, on the 17th of January will be invisible on this continent. An annular eclipse of the sun on the 1st of February, invisible in North America, but central and vertical in the Indian Ocean, near the Isle of Java. A partial eclipse of the moon, on the 18th of July, visible throughout the United States; first contact with shadow, 1 o'clock, 6 min.; middle of eclipse, 2 o'clock, 35 min.; last contact with shadow, 4 o'clock, 8 min.; meantime, morn; magnitude of eclipse, 8 2-5 digits on moon's southern limb. A total eclipse of the sun, on the 28th July, partially visible. This eclipse will be total at Baffin's Bay, Labrador, a part of Greenland, and in the Atlantic Ocean, east of Newfoundland.

### Improvements in London.

Improvements are to be made to a considerable extent in the city of London. Furnaces and fire-places, used in manufactures, are to be compelled to consume their own smoke,—nuisances are to be removed, and part of the area around St. Paul's to be laid into the public thoroughfare.

# Scientific American

NEW YORK, JANUARY 11, 1851.


### Bills for Reforming the Patent Laws.

We presume that a brief synopsis of the bills now before the Senate, for reforming the Patent Laws, will be of great interest to a majority of our readers. We will therefore endeavor to present a clear outline of their features. We distinguish the Bill introduced into the Senate during last Session, and the Amendment proposed by Senator Davis, and call them "Bills," for they are totally distinct. The first is nearly the same as the one adopted by the Convention of inventors assembled at Baltimore. It is an amendment to the present Patent Code, and enacts that the Commissioner shall be more specific in giving his reasons for the rejection of patents, and that all correspondence be kept on file in the Patent Office, and all objections made by other parties to the issuing of patents be kept on file, and that certified copies of the said objections, correspondence, decisions, &c., be considered prima facie evidence in all cases. It provides pointedly against granting reissues of patents claiming more than what was embraced in the original specification. It provides that no inadvertence or mistake, when remedied, shall have a retrospective effect. It provides for the writ of *scire facias*, exactly as we stated last week. We believe that the writ of *scire facias* will be a benefit to inventors, only the bill should be amended so as to read that "all such cases must be tried in a summary manner." The dilly-dallying of our Courts, the delays, &c., are anything but creditable to our business character as a nation. The great fault which we find to the *scire facias* is, that it authorizes the grant of such a writ in every case. This should not be —there ought to be some limit to it, and in no case would we allow it to be granted until one trial at equity had shown that there was some defect or fault in the patent. This section should be modified. The sixth section provides that any one of the interested parties shall have a right to appeal to the Supreme Court of the United States, in any suit on a patent, in which the validity or construction of a patent is in dispute, and also in any proceeding by *scire facias*. This last clause should be stricken out. We don't want too much of the *scire facias*. The eighth section provides than any patent, extended by Congress through fraud and false representation, be declared void; this section will bear reforming—it should provide the way to prove the fraud. But we would take away the whole practice of Congress extending patents, and adopt some better plan.

These are the main features of the bill, which show any difference to the present code, excepting the 11th section, which allows foreign patents to be adduced as evidence. We dilated somewhat on this last week, and hope our remarks will meet with approval.

The amendment (Bill) proposed by Senator Davis, in the very first section, provides to confer more powers on the Patent Office. Inventors, what do you think it is? Why, it confers on the Commissioner supreme authority, (we will use the very words), he "may refuse to grant letters patent whenever it may appear that the applicant has abandoned his invention." This looks like a cunning touch coming from the Patent Office, to injure the rights of inventors who may see fit to give some public account of their inventions before applying for patents. This never can become a law. The second section provides that those filing caveats should make oath to their inventions. This is all right. The third section provides that, upon complaint and oath of patentees, or their heirs and assignees, of their belief that some person is using their invention secretly, persons may be appointed to examine the premises of the alleged infringer to see if the patent is infringed, but shall be sworn by the judge not to divulge what they may see in the examination, which does not, in their judgment, infringe the patent. "If admission for examination is refused, the refusal is to be deemed *prima facie* evidence that the person so charged is infringing the patent." We have no comments to make on this clause, because we don't know very well what to think about it just now. The fourth section provides that the fees for additional improvement shall be the same as for the original patent—a rise from $15 to $30; also that only one-third of all fees be returned instead of two-thirds, as is now the case. This shows the origin of the Bill;—this is what was recommended by the Commissioner. Is the Patent Office getting poor? If it pays its own expenses, as it now does, and a little more, is it not sheer injustice to raise the fees? It is. The fifth section provides that for every time a patent is questioned in validity, by trial, after the first trial, and decision given for plaintiff, treble costs will be allowed for this second trial, four-fold damages for the third, and so on; and if a patent be decided invalid the same number of times, damages in the same ratio to be allowed for defendant, excepting in some cases where the patent has been affirmed and in others *dis*-affirmed, when the damages are to be adjusted accordingly by the Court. This is a splendid section of confounded confusion. What a fund of trouble it would cost if it were to become a law. The sixth section is a good one; it provides that a jury be instructed to enquire if the defendant has knowingly and willingly infringed the patent; when, if such be proven, he shall forfeit all his machinery or articles which infringe the patent, and this irrespective of damages. There is a provisionary clause in this section which we cannot quote to make sense out of it—it is obscure in its meaning. The seventh section provides that, with the consent of both parties, three experts may be chosen by them to decide a question of infringement, like a jury—the verdict of two to be treated like that of a jury. This is not an objectionable feature, but it is a very inconclusive one. The eighth section provides that no hearing will be granted to parties to contest the priority of invention, before the Commissioner, three years after the grant of a patent. This is right. The ninth section is nearly a duplicate of our present law for designs and ornamental work. The tenth section is but little more than a duplicate of section five of the law of 1842—only fifty dollars for every case is to go to the Patent Fund. The eleventh and twelfth sections are not important, but the twelfth provides that the Commissioner cause to be prepared a general analytical and descriptive index of American inventions and discoveries, and continue the same from year to year, to accompany the annual Report of the Patent Office. This practice is now pursued by Mr. Ewbank; it is commendable in every sense. Section fourteen provides that one compiling clerk be employed at a salary of $2,000 per annum, and an assistant with a salary of $1,200. Section fifteen provides that the sum of $6,000 per annum be appropriated to carry this act into effect, to be paid out of the patent fund. Section sixteen is of no moment, but section seventeen provides for the repeal of the act of 1832, relating to designs, for which sections nine, ten, and eleven are to be substitutes; they are not very important.

These are the principal features of the two bills. Let our Senators be careful and cautious about reforming the patent laws. We will suggest an improvement—a material one —next week. Laws should not be made in too great a hurry, and above all patent laws.

### Bain's Telegraph in France.

By the last news from Europe, we learn that Dr. Lardner recently gave a grand soiree at his splendid apartment in the Rue de Lille, to exhibit the new telegraph machines made by order of the government on Mr. Bain's models. It is intended to put them on the Calais line, but it is out of repair, and, therefore, one of the machines has been sent to Tours, to try the experiments on Bain's system on that line. No definitive arrangement has yet been come to for the purchase of the patent by the government; but there is reason to believe that for once the confidence of inventors will not be abused.

### The Inventor of the Power Loom.

The Worcester Palladium, of January 1st, publishes a paper from a manuscript left by Mr. Samuel Rugg, of Lancaster, Mass., wherein he claims to be the inventer of the power loom. The document is a singular one, we therefore publish it entire;—

"Having read Rev. Henry A. Miles's history of Lowell, I find he ascribes the invention of the power-loom to Francis Cabot Lowell and Patrick T. Jackson, in the winter of 1812 and '13. In 1811 and '12, I heard they were buying information, at Waltham, respecting weaving; and at that very time I was making cloth at Lancaster, Mass., by turning a crank which moved a band. I also learned that 25 patents were taken out of the patent office. My model and description of a loom, by which I wove cloth, was deposited in the patent office before 1813. I sent it to the office at Washington by the representative from our district, Hon. Abijah Bigelow, of Leominster. In two years after that I heard they were weaving in Waltham by water—it resembled mine very nearly. I had waited two years to find a method to carry the web up as fast as the cloth was made. When there were so much going to the office for patents, they must of course have seen my model and explanation. Why did not Messrs. Lowell and Jackson obtain letters patent, unless because mine was in the office before them? The incentive which led me to the undertaking was being a warm patriot, and the sight of some tories. My wife was a weaver from a youth, and had broken her stomach down. She said I was as crazy a man as she ever saw, for if such a thing could be done, it would have been done somewhere in the world before that time. I persevered, with my head sometimes between my knees, till I thought of turning the lathe topsyturvy, and then with a shaft underneath, with figures or cams fixed on it, I contrived to spread the warp, throw the shuttle, and beat up the thread. But I had to let it off every two inches, or there would be a gall in the cloth. I had been exposed, and thought best to send my invention to Washington: and by that means sent it into the world."

[No doubt honest old Samuel Rugg was sincere in his opinion that he was the first inventor of the power loom; in all likelihood he never saw one before he made his own; but Vancausin had suggested one long before our Revolution, and Dr. Cartwright received a patent for one in 1747; and in 1790 a power loom factory was established in Doncaster, England, which was driven by a steam engine; this was at least twenty-three years before honest Samuel Rugg claimed his invention.

### Passages of the Atlantic Mail Steamships from Liverpool to New York, from Sept. 21, 1850, to Jan. 1, 1851.

The Pacific (American) arrived in New York on Saturday evening, 21st Sept., 1850, after a passage of 10 days 4¾ hours. This was the shortest passage ever made between the two ports.

The Niagara (British) arrived at New York on Friday the 27th Sept., after a passage of 12 days 20 hours.

The Atlantic (Am.) arrived at New York on Wednesday, 9th Oct., at 10 A. M. She left Liverpool on the 25th Sept., at noon—passage 13 days and 22 hours.

The Europa (Br.) arrived on the 11th Oct., at 8 A. M. She left Liverpool on the 28th Sept., at 2 P. M., thus making the passage from port to port in 12 days and 18 hours. She anchored, however, outside the Hook at half-past 9 P. M., on the 10th.

The Asia (Br.) arrived on Thursday, Oct. 24, at 11 A. M., after a passage of 10 days and 23 hours.

The Pacific (Am.) arrived on the 26th Oct., at 12½ P. M., after a passage of 11 days 2½ hours. She left Liverpool at 10 A. M.

The Africa (Br.) arrived on Friday the 8th Nov., at 8 A. M., after a passage of 12 days and 20 hours—her first passage.

The Atlantic (Am.) arrived on Tuesday the 12th Nov., at 1 P. M., after a passage of 12 days 22 hours.

The Niagara (Br.) arrived on the 22nd Nov., at 9 A. M., after a passage of 12 days 21 hours.

The Arctic (Am.) arrived on Wednesday the 5th Dec., at 8 P. M., after a passage of 14 days 8½ hours.

The Asia (Br.) arrived on Saturday Dec. 7, at 10½ A. M., after a passage of 13 days 22 hours.

The Africa arrived on Saturday evening, 21st Dec., at 12 P. M., after a passage of 14 days 12 hours.

The Baltic arrived at New York on the 1st January, 1850, after a passage of 18 days from port to port, but she arrived at Provincetown, Mass., on Sunday, to take in a supply of coal, and thus was detained more than three days.

[We intend to keep a quarterly record of the passages made from Liverpool to New York, the same as the above, which we know will be of great interest to many of our readers.

### Compound Gases---Oxygen and Hydrogen.

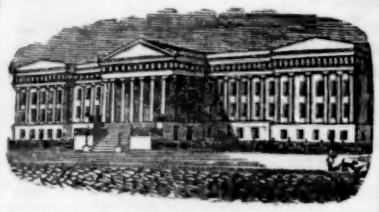
It has generally been allowed that water is a compound of two simple substances, oxygen and hydrogen. The late discoveries alleged to have been made by Mr. Paine, go to prove that water is not composed of these two gases; or, as asserted by Mr. Paine, oxygen is composed of one gas and positive electricity, and the same gas is hydrogen when combined with negative electricity. So far as the catalyzing of the hydrogen is concerned, to enable it to produce a white light, by simply passing through turpentine, the communication on another page, from Dr. Foster, confirms all that has been said about it, as being perfectly correct. Mr. Nasmyth, at a meeting of the British Association, stated that he believed carbon to be a metal, but we have never heard a single hint relative to hydrogen being one.

Nitrogen is called one of the simple bodies, but Davy believed that it was a compound. *Oxygen* is held to be a simple gas, but Mr. Nelson, in 1848, in a series of articles, entitled "New Chemical Law," published in Vol. 4, Sci. Am., uses the following language—"Oxygen must be a chemical compound; some future attempt at its decomposition may prove effectual; it is at least worthy of a trial, for it plays an important part in nature; a true knowledge of its composition is therefore much to be desired." He also held *fluorine* to be a chemical compound. We wish to call attention to these things because we conceive that there is much in the articles of which we speak that is worthy of attention. The article from which we take the above extract will be found on page 112, Vol. 4, Sci. Am

### Veto of the Gas Contract.

Mayor Woodhull vetoed the contract passed by vote of our Common Council with the City Gas Companies, which was to last for eighteen years, as mentioned by us last week. The Mayor has received the heartfelt thanks of our whole city for his veto. The contract was an outrage upon the principles of honesty and decency. By the veto message we learn that the companies receive for each gas lamp from $11 to $12 each, the same as for oil lamps. By the new contract the companies were to receive $15 per year for each public burner—being $3 more than they now receive, or $26,985 dollars per annum. Fifteen dollars for each burner—this is going it with a rush. In some of the cities of Great Britain, where such contracts have been left to public competition, one burner costs no more than $3 per annum. In our country, where monopolies should not be allowed to fatten on the public, we see that it is just the land for them—especially New York Gas Monopolies. The most iniquitous feature of the new contract was the annulling of the old one, of $12 for each lamp, and the contract for $15 for each to come into operation on the 1st January, 1851, while the old contract did not expire until 1853—thus a bonus of more than $12,000 was to be paid to the companies for being so kind as to receive a new contract for eighteen years of the future history of New York City. We dislike this legislation for succeeding Municipal Governments.

We are indebted to Senator Benton for a copy of his speech upon the highway to the Pacific. It contains interesting information.



☞Reported expressly for the Scientific American, from the Patent Office Records. Patentees will find it for their interest to have their inventions illustrated in the Scientific American, as it has by far a larger circulation than any other journal of its class in America, and is the only source to which the public are accustomed to refer for the latest improvements. No charge is made except for the execution of the engravings, which belong to the patentee after publication.

## LIST OF PATENT CLAIMS
### Issued from the United States Patent Office.

FOR THE WEEK ENDING JANUARY 1, 1851.

To C. J. Anthony, of Pittsburgh, Pa., for improvement in Daguerreotype Pictures.

I claim the application of transparent or translucent materials, of varying thicknesses and forms, separately or in combination with each other, and the application of substances or materials, more or less opaque, either separately or in combination with transparent or translucent materials, both or either, when such applications and combinations are separately, consecutively, or conjointly employed for the purpose of manipulating the action of light, or chemical substances, substantially in the manner and with similar effects to those described and shown.

To Silas M. Cochran, of Baltimore, Md., for improvements in Car Couplings.

I do not claim the method of coupling railroad cars &c., by means of double coupling irons or jaws, in combination with a sliding bar for disengaging or unlocking said double irons or jaws to relieve the connecting bolt from the draught beam of the leading car, by the deflecting of said leading car from the proper line,

But what I claim is, in combination with the curved arms or ends of the jaws, the turn-slotted bar attached to the casting, having its ends curved in such a manner as to act as levers, and the spring for keeping the slotted bar and jaws in their proper position, the disconnection of the cars being effected by the contact of the curved arms or ends of the turning bar in the draught beam, when the preceding car runs off the track, when either of the curved arms of the jaws will be relieved from the slot of the turning bar and permit its curved end to move outward and open its outer end, and permit the connecting bolt to pass therefrom.

To J. B. Collins, of Reading Pa., for improved Nozzle for Lead Pipe Machines.

I claim the corrugated nozzle, with its mandrel, through which melted lead is pumped, for the purpose of making pipe, as herein set forth.

To W. E. Cornell, of Boston, Mass., for improvement in Planing Machines for dressing the edges of boards.

I claim the method, substantially as described, of communicating motion from the bottom to the top roller, by the two pinions, combined with the wheel having the inner and outer rim of cogs, by means of the joint links, substantially as described and for the purpose specified.

I also claim operating the machinery for carrying the cutter wheel towards or from the line of motion of the plank, by the passage of the plank over and in contact with a spur wheel or wheels, substantially as described, whereby the motion of the cutter wheel for edging tapering planks, will be made to correspond with the motion of the plank itself, as described.

I also claim interposing between the wheel or wheels, actuated by the planks and the carriage of the cutter wheel, a reversing motion, substantially as described, by means of which the machine can be made to act on the plank, from the narrow towards the wide end, or vice versa, or by suspending its operation, edge the plank with parallel sides, as described.

To John Ericsson, of New York, N.Y., for improvement in Water Metres.

I claim connecting the two pistons with the two cranks of a crank shaft, in the manner substantially as described, so that at the end of each stroke of either of the pistons, it shall remain at rest, while the crank shaft is being impelled by the other piston, so that the valves shall be shipped, whilst the piston is at rest, for the purpose, substantially as described.

I also claim, in an instrument for the purpose, herein specified, determining the range of motion of the pistons, by means of stops connected with the cylinders and the pistons, substantially as described, in combination with the connection of the piston with the crank or cranks, by means of a joint having sufficient play to permit the pistons alternately to remain at rest, while the crank shaft continues to rotate, substantially as described.

I also claim enclosing all the moving parts of an instrument, substantially as above described, in the surrounding casing, through which the water or other fluid passes to be measured, constructed and operating in the manner and for the purpose substantially as described.

To Daniel Fisher, of College Corner, Ohio, for improvement in Churns.

I claim connecting two vertical churns by a horizontal tube at their bottoms, substantially as described (said tube being about ten inches long and about one-fifth of the capacity of one of the vertical cylinders,) in combination with the perforated cutters, operating in the manner and for the purpose herein fully set forth.

To S. H. Gilman, of Cincinnati, Ohio, for method of connecting the slide valve with the rock shaft.

I claim the tubular vent serving the two-fold purpose of a guiding rod and a clamp for the ball-joint, at the foot of the valve pitman.

To L. D. Grosvener, of Harvard, Mass., for improvement in machines for assorting broom corn.

I claim the combination of the endless platform, the roller, and the series of pressure rollers, or any mechanical equivalents therefor, as arranged and made to operate together, substantially in the manner and for the purpose, as described; and in combination therewith, I claim the rotary shears and the weighted roller, or their mechanical equivalents, the whole being applied and made to operate together, essentially as herein specified.

To Abraham Kaufman, of Orrstown, Pa., for improvement in Quilting Frames and Apparatus.

I claim the movable frame, working on the connecting piece containing two slides with wickers, for the purpose of stretching the quilt to any desirable length or breadth, as the case may be, in combination with the slides working in sections, by which the quilt may be enlarged or diminished, and the rollers as set forth.

To John Lamb & C. H. Root, of McDonough, N. Y., for improvement in Spring Carriage Wheels.

We claim the construction of the spokes of flat steel, split or divided, and curved and secured, for the purpose and in the manner herein shown.

To James Manning, of Middletown, Conn., for improvement in Candlesticks.

I claim the combination of the flanch with the circular cap, having its orifice eccentric with its periphery, and a guard operating in the manner and for the purpose as above described.

To Shelden Northrop, of New Milford, Conn., for improvement in Looms for weaving seamless bags.

I claim the arrangement in one loom, of the two series of cams, substantially as described; one series for weaving the cloth double, and the other single, as herein described, in combination with the shifting the treddle from one series of cams to the other, or the equivalent thereof, substantially as herein described.

To James P. Ross, of Lewisburgh Pa., for improvement in Seed Planters.

I claim, first, the pinion working between fixed and movable racks, in combination with the elevating yoke and the loop on its end, for the purpose of raising the teeth from the ground and simultaneously throwing the feeding apparatus out of gear, substantially as set forth.

Second, I claim the feed gear, as described, in combination with the lever and its adjustable fulcrum, permitting the pinions to be reversed, by which double the number of changes can be made as can be done by the same number of pinions in the ordinary arrangement.

To Stephen P. Ruggles, of Boston, Mass., for improvement in Printing Presses.

I claim the gauge bar for cards, in combination with the vibrating platen and stop finger, and crank which operates the same, in the manner and for the purpose herein above described.

I also claim the use of a segment of a cylinder, in combination with the stationary form bed, so the rotary inking apparatus may move over the form, and then, after taking ink from the fountain, distribute it on said cylinder, as herein set forth.

I also claim the movable bearers on the side of the form bed, arranged and operated substantially as herein described, so as to be moved outwards when the inking rollers are passing over the form, and drawn inwards when the sheet or tympan is moved up to said form.

I also claim regulating the delivery of the ink by combining with the delivery roller a grooved ratchet wheel and weighted pawl band, operating with the lever stud, cam roller, and stop lever, substantially as herein specified.

I also claim supporting the journals of one of the inking rollers on sliding bearers, so that it may be moved up against the delivering roll, by means of studs on said bearers, and cams operating the same as herein set forth.

To Jonathan Russell, of Philadelphia, Pa., for improvement in Machines for turning irregular forms.

I claim the combination and arrangement of the horizontal carriages, G G, working inside of, and moving vertically with the carriage, F, and operating as herein described, for the purpose of making the pattern and rough material pass and repass the tracers and cutting tools, or vice versa, when the same are used in combination with a pattern and rough block, which do not revolve, and are presented to and operated upon by said tracers and cutters, as herein described, and for the purpose set forth.

To J. T. Trotter, of New York, N. Y., for improvement in the manufacture of India Rubber.

I claim the use and employment of zinc, substantially as prepared by the process above described, in combination with india rubber, for the purpose of curing or vulcanizing it, in form and manner as herein set forth, without the use of free sulphur, in any way, in combination with the rubber.

### RE-ISSUES.

To Edward Reynolds, of Haddonfield, N. J., for improvement in a machine for bending or setting felloes for the wheels of carriages and wagons. Patent dated July 17, 1835; extended July 11, 1849; re-issued Jan. 1, 1851.

I claim the method, substantially as described, of bending felloes for carriages, by means of a cylinder upon which the felloe is bent, and a friction roller or its equivalent, against which it is bent, substantially as described, when used in combination with a strap for preventing the wood from splitting on its exterior surface, or otherwise.

### DESIGNS.

To Wm. C. David, of Cincinnati, O., for design for a Cooking Stove.

To Chas. Gilbert & W. G. Hallman, of Philadelphia, Pa., (assignors to Chas Gilbert, of Philadelphia, Pa.), for design for Stove.

### Niagara Suspension Bridge.

The Trenton Gazette states that John A. Roebling, Esq., of that place, has been appointed by the Niagara Suspension Bridge Company to enlarge and improve the Suspension Bridge in such a manner as to render it fit and proper for the passage of Railroad cars. Mr. R. will commence the work in the coming spring, and complete it within the year. The undertaking is in connection with the Rochester, Lockport, and Niagara Falls Railroad, the construction of which is to commence without loss of time.

### Increase in Price of Scotch Pig Iron.

By the last news from Europe, the price of Scotch pigs had advanced from one to two shillings and sixpence per ton, and in Staffordshire the pig iron makers have established a resolute return to the figures at which they were selling three months ago, being in some instances equivalent to a still more considerable advance.

For the Scientific American.

### Mechanical Principles.--No. 2.

In respect to the law of gravity, it is well known that there is a diminution of it as we ascend mountains, and it also diminishes as we descend mines, because the stratum of earth above opposes instead of assisting the attraction of that below. This has been proven by swinging a pendulum at the bottom of some mines. The attractive force, termed gravity, has been shown by a plumb line near mountains. In 1774, Maskelyne noticed a deflection of 6″ from the vertical position of the plumb line in the mountain of Schehallian.

Gravity, then, is a universal property common to all matter—every particle in the universe attracting every other particle. The attraction, however, between two bodies, both of moderate size, is too feeble to be observed under common circumstances. But the attraction of ships upon boats is well known, and many bathers have experienced it in their own bodies, when near large vessels, in the water. By careful measurement, its force in the latitude of London is such as to cause a body to fall through a space of nearly 32 2-10 feet in the first second of time, supposing that body to fall in vacuo.

In order to determine the *space* which a body, falling freely by the action of gravity, would describe in a given time, we must multiply the square of the time in seconds by 16 1-12 (or, as an approximation only, simply by 16); the product will be the space fallen through by the body in feet. To determine the time which a body would occupy in falling from a given height, we must divide the square root of the height in feet by 4; the quotient will be the time occupied in seconds. To determine the velocity which a body, exposed to the action of gravity for a given time, would acquire, multiply the time in seconds by 32 1-6, and the product will be the velocity in feet per second; or to determine the velocity acquired by a body in falling from a given height, multiply the square root of the height in feet by 8 1-24, (or, as an approximation, simply by 8), and the product will be the velocity of the body in feet per second.

The following table, constructed on the same principle as that given above for any force whatever, contains the actual numerical values of the several quantities for a body falling freely by the action of the force of gravity.

| Time in seconds of the body's falling. | Velocity acquired by the body in feet per second. | Space in ft. fallen through by the body in the whole time. | Space in ft. fallen through by the body in each second. |
|---|---|---|---|
| 1 | 32 1-6 | 16 1-12 | 16 1-12 |
| 2 | 64 1-3 | 64 1-3 | 48 1-4 |
| 3 | 96 1-2 | 144 3-4 | 80 5-11 |
| 4 | 128 2-3 | 257 1-3 | 112 7-12 |
| 5 | 160 5-6 | 402 1-12 | 144 3-4 |
| 6 | 193 | 579 | 176 11-12 |
| 7 | 225 1-6 | 788 1-12 | 209 1-12 |

What gravitation is we scarcely dare speculate. Some consider it to be magnetism, and there is much plausibility in some of the arguments brought forward to prove this. We know that it is a power higher than the more tangible forces with which we are particularly acquainted; it is a power which spans all space, and its very subtility proves that there is a power beyond it more subtle still. The law of falling bodies, (with which every mechanic should be well acquainted, or he will find his mind somewhat shackled), was first discovered by Galileo, but it obtained a more complete development in later times, by the machine of Attwood.

At the commencement of the study of the principles of falling bodies, let it be understood that a body begins to fall from a state of rest, and the further it falls its velocity increases uniformly with the increment of the time it occupies in falling, and then there can never be any mistake made, for if the velocity increases with the time a body takes to fall, it will fall through a greater space during the third second of time than during the second or first seconds. If no such law existed, there would be no more power in a fall of water 32 feet high, than one of 2 feet.

MACLAURIN.

### TO CORRESPONDENTS.

"L. R. H., of Pa."—Breast studs having moveable tops are not new. The same plan as you describe was patented last August, we think by Mr. Coston, of Philadelphia.

"C. F. D., of M. D."—We will publish yours next week.

"A. D. B., of Geo."—Yours containing $2 for Mr. P. is received. We were sorry not to have been more definitely instructed in regard to the shipment of the telescope. The expense is however no more than any express would charge for the same distance. You can send us subscribers in the way you propose.

"S. H., of Mass."—We know Morse's Air Distributor well. We do not believe that you could secure a patent so as to obviate the claim. There is an engraving of it on page 258, Vol. 5, Sci. Am.

"E. M., of Pa."—We don't know Donlan's patent; a plan to do the same thing was to steep the flax in a weak solution of ley, and drain it through fluted rollers, in a wet state, This is all we know about it.

"S. H., of Ind."—We believe that your improvement is patentable, but we do not believe that it would be of much advantage to yourself.

"A. S., of Pa."—Your improvement in wagon locks strikes us very favorably, and we advise you to construct a small model and send it to this office with as little delay as possible; a model will be required before any further steps can be taken towards securing Letters Patent.

"O. P. S., of Ohio."—We do not know how to advise; our opinion, however, is, that a patent should be granted for the improvements. We had no knowledge of any such process as you described.

"E. H., of Conn."—We do not see how you could obtain a patent on the design of your mill. They may not have been constructed in this shape before, but the arrangement is not new as applied to other purposes, and could scarcely be considered a patentable subject under the law of designs. We advise you not to apply.

"P. L. C., of Pa."—Lactic is an acid, generated whenever milk, and, perhaps, most animal fluids become spontaneously sour, or when the juice of beet root is preserved for some months at a high temperature. The salts are called lactates.

"S. E., of N. Y. City."—The Volta-Metre is an instrument for measuring the intensity of the electric current. It consists of a cell of decomposition, containing dilute sulphuric acid, and so formed as to admit of the collection and measurement of the evolved gases. The electrolyte which best fulfils all the requirements, is water.

"J. S. P., of N. H."—The principle of your improvement in springs is essentially the same as the patent of J. Maxon. You could not obtain letters patent for yours.

"M. K., of Mass."—You will be safe in employing an honest mechanic to construct a model. This is all the advice we can give upon the subject.

"E. S., of Conn."—We cannot fully understand your device without the aid of a well-described drawing. Machines for the purpose are now in use. We are unable to make out the name of the person you refer to who makes bone grinding machinery.

"G. C., of Miss."—We do not think a patent could be obtained for the separator. The principle was patented last year.

"S. T., of Conn."—You will please forward a model of your churn about one foot square (or less) in size, to this office, for examination. There are such an endless variety of churns that it is difficult to say whether a patent could be obtained or not.

"E. T. G., of Mich."—The principle of your alleged improvements in threshers is thought to possess sufficient novelty to warrant an application for Letters Patent. You should construct a substantial model on as small a scale as possible, showing your improvements in full, and forward it to this office; upon its receipt it will be further examined.

"W. W. B., of Phila."—Yours shall be attended to next week.

"A. A., of Geo."—We do not fully understand your plan for saw and grist mills. We advise that you send us a sketch, described by letters of reference; this will enable us to understand the details. Your description is somewhat indefinite.

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Money received on account of Patent Office business, since Jan. 1, 1851:—

J. C., of Pa., $30; S. G., of N. H., $32; J. W., of N. Y., $30: L. I. W., of R. I., $20; J. T. D., of N. Y., $128.

### Patent Claims.

Persons desiring the claims of any invention which has been patented within fourteen years can obtain a copy by addressing a letter to this office; stating the name of the patentee, and the year the patent was granted (adding the month of the year when convenient), and enclosing one dollar as fee for copying.

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128 FULTON ST.

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**WORLD'S FAIR, LONDON, in 1851**—ANDREW P. HOW, Civil Engineer and Machinist, 35 Mark Lane, London, England. Mr. How is a native of the United States, in the above named business in the city of London. He offers his services to those of his countrymen who may have any kind of steam or other machinery to be exhibited at the Great Fair. He will, if required, receive it on arrival, and do all that may be necessary towards its erection, &c. References in New York—Thos. Sewell, 701 Broadway; Joseph Barton, 516 Grand st. 16 8*

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Oakland Works, Sag Harbor, L. I.

"Mr Byram has established his reputation as one of the first clock makers in the world"—[Scientific American. 17 5eow*

**HUTCHINSON'S PATENT STAVE MACHINE.**—C. B. HUTCHINSON & CO., Waterloo, N. Y., offer for sale town, county and State rights, or single machines, with right to use the same. This machine was illustrated in No. 2, Vol. 5, Sci. Am.; it will cut from 1,500 to 2,000 perfect staves per hour. We manufacture machines of different sizes, for keg, firkin, barrel and hogshead staves; also, heading shingle, and listing and jointing machines. These machines may be seen in operation at St. Louis, Mo.; Chicago, Ill.; Savannah, Ga.; Madison, Ia.; Ithaca, N. Y.; Waterloo, N. Y.; Bytown, C. W. Letters directed to us, post-paid, will receive prompt attention. 15 3m*

**LEONARD'S MACHINERY DEPOT,** 116 Pearl st., N. Y.—The subscriber has removed from 66 Beaver st. to the large store, 116 Pearl st., ayd is now prepared to offer a great variety of Machinists' Tools, viz., engines and hand lathes, iron planing and vertical drilling machines, cutting engines, slotting machines, universal chucks, &c. Carpenters' Tools—mortising and tennoning machines, wood planing machines, &c. Cotton Gins, hand and power, Carver Washburn & Co.'s Patent. Steam Engines and Boilers, from 5 to 100 horse power. Mill Gearing, wrought iron shafting and castings made to order. Particular attention paid to the packing, shipping, and insurance, when requested, of all machinery ordered through me. P. A. LEONARD.
15 2m

**TO IRON FOUNDERS, &c.**—Fine ground and bolted Foundry Facing, viz.: Sea Coal, Charcoal, Lehigh, Soapstone, and Black Lead. Fire Clay, Fire Sand, Kaoline, and Fire Brick; also Iron and Brass Founder's superior Moulding Sand, in barrels, or otherwise, for sale by G. O. ROBERTSON, New York. City Office, 4 Liberty Place, Liberty street, near the Post Office. 13 8*

**LAP-WELDED WROUGHT IRON TUBES** for Tubular Boilers, from 1 1-4 to 7 inches in diameter. The only Tubes of the same quality and manufacture as those so extensively used in England, Scotland, France and Germany, for Locomotive, Marine, and other Steam Engine Boilers.
THOS. PROSSER & SON, Patentees,
16tf 28 Platt st., New York.

**MACHINES FOR CUTTING SHINGLES.** The extraordinary success of Wood's Patent Shingle Machine, under every circumstance where it has been tried, fully establishes its superiority over any other machine for the purpose ever yet offered to the public. It received the first premium at the last Fair of the American Institute—where its operation was witnessed by hundreds. A few State rights remain unsold. Patented January 8th, 1850,—13 years more to run. Terms made easy to the purchaser. Address, (post-paid) JAMES D. JOHNSON, Redding Ridge, Conn., or Wm. WOOD, Westport, Conn.. All letters will be promptly attended to. 10tf

**AMERICAN CAST-STEEL.**—The Adirondac Steel Company have re-built their works that were recently destroyed by fire, and are now manufacturing an improved article entirely from home material, as low in price, and warranted equal to any imported steel in market. All sizes Steel, from 1-4 inch to 4 inches square, and from 1-2 inch to 12 inches wide, can be supplied. For sale at the Company's Warehouse, by QUINCY & DELAPIERRE,
14 4* 81 John st., N. Y.

**BARNUM'S PATENT PLANING MACHINE.**—These machines, while they possess equal facilities with any other, for planing coarse lumber for flooring, &c., removes all the objections urged against machine planing, for ship and steamboat building, or fine ceiling, &c., by finishing the material with the grain, fully equal to hand planing, leaving no indentations on the surface of the board (as in all machines using pressure roll-ers in planing, by the chips and knots collected passing between the planed surface and weighted feed rollers, thereby destroying fine work, designed for painting, &c.) as there is no appliance whatever on the planed surface. Contracts may now be made for their construction or use, or for the formation of a joint stock company or companies, in any part of the U. S., to successfully prosecute the business by applying to DANIEL BARNUM, Snowden's Wharf, Philadelphia, where the machines may be seen in constant operation. 14 6*

**DICK'S GREAT POWER PRESS.**—The public are hereby informed that the Matteawan Company, having entered into an arrangement with the Patentee for the manufacture of the so-called Dick's Anti-Friction Press, are now prepared to execute orders for the following, to which this power is applicable, viz.—Boiler Punches, Boiler Plate Shears, Saw Gummers, Rail Straighteners, Copying and Sealing Presses, Book and Paper Presses, Embossing Presses, Presses for Baling Cotton and Woollen Goods—Cotton, Hay, Tobacco, and Cider Presses; Flaxseed, Lard, and Sperm Oil Presses; Stump Extractors, &c. &c. The convenience and celerity with which this machine can be operated, is such that on an average, not more than one-fourth the time will be required to do the same work with the same force required by any other machine.
WILLIAM B. LEONARD, Agent,
13tf No. 66 Beaver st., New York City.

**WATER POWER FOR SALE OR TO LEASE**—55 miles from New York, and 3 miles from the Harlem R. R. Depot at Croton Falls. There is a never-failing stream of water, with a fall of 200 feet in one-third of a mile, and about 150 horse power, without any cost of damming or danger from floods. It is a fine situation for a series of small manufactories and mechanic employments requiring motive power. There are on the premises, consisting of 11 acres of land, a grist and plaster mill, with three runs of stone, and 2 dwelling house. The country is healthy, fruitful, and picturesque. Enquire of T. R. LEE, Croton Falls. 15 6*

**STRAW CUTTER FOR SALE.**—We have on hand one of Macomber's Improved Straw Cutters, patented Nov. 5, 1850, illustrated in No. 50, Vol. 5, Sci. Am. Price $10. Address MUNN & CO.

**GURLEY'S IMPROVED SAW GUMMERS**—for gumming out and sharpening the teeth of saws can be had on application to G. A. KIRTLAND, 205 South st., N. Y. 10tf

**SCRANTON & PARSHLEY,**—New Haven, Conn., will have finished by the 15th of December, 12 Engine Lathes of 8, 10 and 12 feet beds, and weigh 1500, 1650, and 1800 lbs; price $200, $220 and $240. These Lathes are from a new set of patterns, and are greatly improved from their former small size lathes; they swing 21 inches, and have back and screw gearing, centre rest, follow rest, drill, chuck and overhead reversing pulleys, all hung in a cast iron frame, ready for use. On and after the first of Dec., by addressing as above (post paid) cuts can be had of these, with index card, showing the different pitch threads that these lathes will cut.

Two of the power planers heretofore advertised in this paper, are now ready to ship to the first order; they weigh from 4500 to 4600 lbs., when finished. 9tf

**A CARD.**---The undersigned begs leave to draw the attention of architects, engineers, machinists, opticians, watchmakers, jewellers, and manufacturers of all kinds of instruments, to his new and extensive assortment of fine English (Stubs) and Swiss Files and Tools, also his imported and own manufactured Mathematical Drawing Instruments of Swiss and English style, which he offers at very reasonable prices. Orders for any kind of instruments will be promptly executed by F. A. SIBENMANN, Importer of Watchmakers' and Jewellers' Files and Tools, and manufacturer of Mathematical Instruments, 154 Fulton street. 1 6m.

**TO PAINTERS AND OTHERS.**—American Anatomic Drier, Electro Chemical graining colors, Electro Negative gold size, and Chemical Oil Stove Polish. The Drier, improves in quality, by age—is adapted to all kinds of paints, and also to Printers' inks and colors. The above articles are compounded upon known chemical laws, and are submitted to the public without further comment. Manufactured and sold wholesale and retail at 114 John st., New York, and Flushing, L. I., N. Y., by
QUARTERMAN & SON,
9tf Painters and Chemists

**MACHINERY.**—S. C. HILLS, No. 12 Platt Street, N. Y., dealer in Steam Engines, Boilers, Iron Planers, Lathes, Universal Chucks, Drills Kase's, Von Schmidt's, and other Pumps, Johnson's Shingle machines, Woodworth's, Daniel's and Law's Planing machines, Dick's Presses, Punches, and Shears; Morticing and Tennoning Machines, Belting, machinery oil; Beal's patent Cob and Corn Mills; Burr Mill, and Grindstones, Lead and Iron Pipe, &c. Letters to be noticed must be post paid. 10tf

**BAILEY'S SELF-CENTERING LATHE,** for turning Broom and other handles, swelled work, chair spindles, &c.; warranted to turn out twice the work of any other lathe known—doing in a first rate manner 2000 broom handles and 4000 chair spindles per day, and other work in proportion. These lathes are simple in construction, not liable to get out of repair, and will do enough more than other lathes, in three months' use, to pay their cost. One of them may be seen at the office of Munn & Co., New York. Price of Lathe for turning broom and hoe handles, rake stales, scythe snaths, windsor and cottage chair legs and pillars, $100, with one set of tools; $125 with two sets. Lathe for turning chair spindles, whip stocks, gun rods, &c., complete, $75. Orders, post-paid, may be forwarded to L. A. SPALDING, Lockport, N. Y. 9 3m

**IMPORATANT NOTICE TO CONFECTIONARY MAKERS**—Whereas, a patent was granted to the undersigned, Oct. 8th, 1850, for an improvement in the manufacture of Comfits, and from certain knowledge which he has received, he believes that parties are using it without his consent. Vigorous measures are now being taken to ascertain who the unprincipled parties are, in order that they may be dealt with according to law. This notice is to warn all not to infringe the patent, as it is not the intention of the patentee to dispose of rights. Parties using it will have no authority. W. H. HOLT, Patentee.
Hartford, Conn., Nov. 25, 1850. 11 8*

**FOREIGN PATENTS.**—PATENTS procured in GREAT BRITAIN and her colonies, also FRANCE Belgium, Holland, &c., &c., with certainty and dispatch through special and responsible agents appointed, by, and connected only with this establishment.—Pamphlets containing a synopsis of Foreign Patent laws, and information can be had gratis on application
JOSEPH P. PIRSSON, Civil Engineer,
7tf Office 5 Wall street, New York.

**RAILROAD CAR MANUFACTORY.**--TRACY & FALES, Grove Works, Hartford, Conn. Passage, Freight and all other descriptions of Railroad Cars, as well as Locomotive Tenders, made to order promptly. The above is the largest Car Factory in the Union. In quality of material and in workmanship, beauty and good taste, as well as strength and durability, we are determined our work shall be unsurpassed. JOHN R. TRACY,
16tf. THOMAS J. FALES.

**FOWLERS & WELLS,** Phrenologists and Publishers, Clinton Hall, 131 Nassau st., New York—Office of the Water Cure and Phrenological Journals. Professional examinations day and evening. 3 6m

**MANUFACTURERS' FINDINGS** and Leather Binding.—The subscriber is prepared to offer a large assortment of manufacturers' Findings for Cotton and Woollen Factories, viz., bobbins, reeds, harness, shuttles, temples, rockers, harness twines varnish, roller cloth, card clothing, card stripper and clamps, calf and sheep roller, leather, lace, and picker string, potato & wheat starch, oils, &c. Leather Banding, of all widths, made in a superior manner from best oak tanned leather, rivetted and cemented.
15 3m P. A. LEONARD, 116 Pearl st.

**PATENT RIGHTS FOT SALE.**—The inventor of the patent "Cut-Off," illustrated in No. 14, Scientific American, desires to effect sales of rights—town, county and State rights will be sold on reasonable terms. Address G. B. MILNER, Houston, Texas, post-paid. 15 4*

**UNITED PATENT OFFICE IN PARIS AND LONDON.**---GARDISSAL & CO., 9 Arthur st., west, city, London; Paris, 29 Boulevard St. Martin.—Procuration of Patents for England, Ireland, Scotland, France, and all countries; and transactions of all business relating to patents, (sale and licenses,) specifications, oppositions, &c. "The Invention," monthly journal, $1 a-year. 15 4m*

**PATENT RIGHTS FOR SALE.**---The undersigned, having received letters patent Oct. 22nd, 1850, for a valuable improvement in Straw, Stalk, and Cane Cutters, is desirous of disposing of rights to parties, to make and sell the same. Cash or, if preferable to the purchaser, available Western lands will be taken in payment. See engraving in Vol. 5, No. 7, Sci. Am. H. W. BERTHOLF,
26 2* Sugar Loaf, Orange Co., N. Y.

# Scientific Museum.

For the Scientific American.

### Hydrogen a Metal.

That hydrogen can be rendered more brilliant than is usually exhibited in its combustion, is now a fact beyond dispute. He, who doubts this, can very easily satisfy himself, by transmitting a stream of the gas through pure turpentine-camphene, and burning it as it is evolved by means of a jet. Nor is there any greater pressure needed than that afforded by the bottle or vessel, through which it passes, containing the camphene. Nor does the brightness of the flame at last diminish to the bluish paleness, ordinarily seen when the gas is burned without the intervention of a second body, or when passing through impure turpentine.

I use three of Woolf's bottles for the experiment, generating the gas in two of them, whilst the third holds the camphene and jet-tube. I believe the opinion is entertained that the brilliancy is due to a supply of carbon received from the turpentine—an opinion at once contradicted by the fact, that the turpentine loses nothing of its weight, notwithstanding it has given passage to a large quantity of gas consumed. And yet, if it be not carbon which gives the illuminating property to the flame,—what is it? I hold that it is the metal of the gas. Hydrogen is now regarded as an exceeding volatile metal. It is true we have not yet reached that power of science, by which to cause its reduction to a solid or fluid. But its mode of combination with certain other bodies so closely resembles that of metals; in other words, its taking the place of metals in combination, is proof too stubborn to deny it a metallic character, and it is this metallic character which makes the brightness of the flame. The metal-vapor, like the carbon-vapor of the candle or lamp, has been rendered incandescent, and hence the brightness.

And here another question presents itself, whence arises this development of metallic energy? My answer is, that it is caused by catalysis. Sometimes the simple presence of one body will cause others to display energies otherwise concealed, or, rather, lying dormant. It is thus with hydrogen—the camphene so catalyzes it as to super-induce the development of its metallic energies. The hydrogen then burns with brilliancy, because the metal-vapor of which it consists is then undergoing unwonted ignition.

This, in my opinion, is the only legitimate doctrine which can be urged, explanatory of the phenomenon observed in the brilliant combustion of hydrogen—a doctrine which, by-the-bye, goes far to substantiate the general admission, that hydrogen is, in nature, a metal. It is, moreover, a doctrine substantiated by the experiments which have been made with a circular cage of fine platina wire, placed immediately above and at a short distance from the perforations of a hydrogen burner. The flame, I understand, becomes intensely bright, and of which I have satisfied myself by simply using the spongy platinum, furnished by Mr. Kent, of New York, with his hydrogen-generator. The platinum catalyzes the hydrogen so as to exhibit more vividly its metallic property in giving a brighter light than when burned without such influence.

The theory, which I have thus advanced, has not obtained publicity further than what my lectures in the Medical College, of this place, have given to it. Thinking it worthy of the attention of scientific minds I send it for a place in your invaluable paper. It is a theory, which, doubtless, will be assailed; but that is no reason why it should be withheld, but rather a reason for its promulgation, because the collision may strike out a few more of the scintillations of science, and add a little to the dazzling wonders of the age.

C. A. Foster, M. D.

Evansville, Ind., Dec. 18, 1850.

### Imported Maderia Wines.

Maderia wine imported in 1850, 303,125 gallons; in 1850, 193,971 gallons; in no previous year, since 1843, did the quantity exceed 117,000 gallons, and in 1844 it was only 16,000 gallons. In 1843 the average cost was $2,29 per gallon; in 1850 it was less than 50 cents. Sherry wine imported in 1850 212,092 gallons; in 1848, 215,935; and in no previous year since 1843 did it exceed 76,000 gallons. The cost in 1843 was $1,38 per gallon; in 1850 it was 50 cents.

### Hydraulics.

(Continued from page 128.)

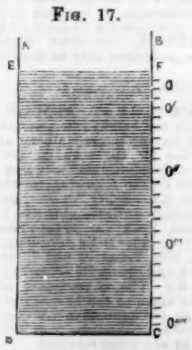
When any of the limits or boundaries which confine a liquid are removed, the force which before was expanded in exciting pressure on such boundary or limit, will now put the liquid in motion, and cause it to escape through the space from which the opposing limit has been removed. The phenomena exhibited under such circumstances, form the subject of a branch of the mechanical theory of liquids usually called hydraulics. It embraces, therefore, the effects attending liquids issuing from orifices made in the reservoirs which contain them; water forced in any direction through tubes or apertures, so as to form ornamental jets; the motion of liquids through pipes and in channels; the motion of rivers and canals; and the resistance produced by the mutual impact of liquids and solids in motion.

It is the peculiarity of this branch of hydrostatics, that, from various causes, the phenomena actually exhibited in nature or in the processes of art deviate considerably from the results of theory, and among millwrights and hydraulic engineers there are a great variety of opinions.

If a small hole be made in the side of a vessel which is filled with a liquid, the liquid will issue forth with a certain velocity. The force which thus puts the liquid in motion is that which before the orifice was made, exerted a pressure on the surface of the matter which stopped the orifice. It is obvious, that the moving force of the water which thus issues from the orifice must be adequate and proportional to the power which produces it. But this power, being the same which produced the pressure upon the surface of the vessel, will be proportional to the depth of the orifice below the level of the liquid in the vessel. Hence we may at once infer, that water will issue with more violence from an orifice at a greater depth below the surface, than from one at a less depth; but it still remains to be determined what the exact proportion is between the rapidity of efflux and the depth of the orifice.

In whatever proportion the velocity of efflux is increased, the quantity of liquid discharged in a given time must be also increased; and, therefore, the pressure or the depth must not only be increased in proportion to the velocity, but also as many times more in proportion to the quantity discharged. Thus the depth of the orifice, below the surface, will always be in proportion to the square of the velocity of discharge.

Fig. 17.




If in a vessel, A B C D, fig. 17, filled with a liquid, a small hole, O, be made at one inch below the surface, E F; and another, O′, at 4 inches below it; a third, O″, at 9 inches; a fourth, O‴, at sixteen inches; and a fifth, O⁗, at 25 inches; the velocities of discharge at these several holes will be in the proportion of 1, 2, 3, 4, and 5. If the upper line in the following table express the several velocities of discharge, the lower one will express the corresponding depths of the orifices:—.

| Velocity. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Depth. | 1 | 4 | 9 | 16 | 25 | 36 | 49 | 64 | 81 | 100 |

It is impossible to contemplate the relation exhibited in this table without being struck by the remarkable coincidence which it exhibits with the relation between the height from which a body falls and the velocity acquired at the end of the fall. To produce a two fold velocity, a four fold height is necessary. To produce a three fold velocity, a ninefold height is required. For a fourfold velocity, a sixteenfold height is required; and so on. Thus it appears, that if a body were allowed to fall from the surface, F, of the water in a vessel downwards towards, C, and obstructed by the water in the fluid, it would on, arriving at each of the orifices above described, have velocities proportional to those of the water discharged at the orifices respectively. Thus, whatever velocity it would have acquired on arriving at O, the first orifice, it would have double that velocity on arriving at O′, the second orifice, three times that velocity on arriving at the third O″, and so on. Now, it is evident that if the velocity of efflux at any one of the orifices be equal to the velocity acquired by the body in falling from the surface, F, to that orifice, then the velocities acquired at each of the orifices will be equal to the velocities of discharge respectively. Thus, if the velocity acquired in falling from F to O be equal to the velocity of discharge at O, then the velocity acquired in falling from F to O′ being double the former, will be equal to the velocity of discharge at O′; and in like manner the velocity acquired at O″ being three times the velocity at O, will be equal to the velocity of discharge at O″. In order, to establish the fact that the velocity with which a liquid spouts from an orifice in a vessel, is equal to the velocity which a body would acquire in falling unobstructed from the surface of the liquid to the depth of the orifice, it is only necessary to prove the truth of this principle in any one particular case. Now it is manifestely true, if the orifice be presented downwards, and the column of fluid over it be of very small height; for then this indefinitely small column will drop out of the orifice by the mere effect of its own weight, and therefore with the same velocity as any other falling body; but as fluids transmit pressure equally in all directions, the same effect will be produced whatever may be the direction of the orifice.

### Bear Hunting in Sweden.

In some parts of Sweden great depredations are committed by bears, which issue from their haunts and destroy the flocks and herds of the farmhouses and villages. When such depredations fall severely on any particular locality, the peasantry assemble together in large numbers, and, extending themselves in a line, beat through that part of the forest in which the "grisly monsters" are supposed to be. The bears, aroused by the shouts and firing with which these proceedings are accompanied, collect themselves together sometimes to the number of twenty, and the hunters then combine their forces, and make a simultaneous attack on the general enemy. Hunted in this way the bear soon pays the penalty of his misdoings; but when attacked by a single huntsman, he often meets with better fortune, for, should the latter miss his aim, or strike any other part of the bear but the head, the enraged beast rushes on him, and wo betide him if he but get him in his grip. In the northern part of Sweden, however, the peasant issues forth undaunted in pursuit of the bear. Sometimes he takes with him two or three small dogs, which, when the bear is found, divert his attention by barking around him, and the hunter is enabled to obtain an opportunity of having a steady and certain aim at him. In this manner oftentimes a peasant will destroy six or eight of these animals. The peasants of Norway exhibit equal intrepidity, and will single-handed attack a bear with whatever instrument may be at command.

John H. Dunnel got only $17,60 per ounce for the best specimens of gold, from the U. S. Mint, but could have $18 in the West Indies, and $17,75 in Wall street. Strange, this.

Why is a clock the most humble thing in existence? Because it always holds its hands before its face, and however good its works may be, it is always running itself down.

### Commissioner of Patents Reports.

Our thanks are due to Senator Thomas Ewing for a copy of the Commissioner of Patents' Reports. The report is a most able and useful one, and has been generally admired.

## LITERARY NOTICES.

"Household Words"—A weekly Journal, conducted by Charles Dickens, better known as the notorious Boz, author of the Pickwick Papers. This journal has reached to near the end of its second volume, and has, as we learn, obtained quite a large circulation in this country under the name of a prominent publisher of this city. The editor cannot conceal his inveterate hatred of us and our institutions, notwithstanding the kisses and sugar plums bestowed upon him while on a a visit to this country some 10 years since. If any one needs proof upon this point, it can be found in an article under the caption of "Food for the Factory," published in No. 36. A meaner or more selfish attempt to ruin the interests of our cotton planters cannot be found in print. The author is evidently muling for favor from a class of "lords" into whose society he has hitherto vainly attempted to ingratiate himself. We have no wish to encourage the circulation of such publications in this country. They ought to be bundled up and returned to the miserable source from whence they eminate. We are so short sighted and obtuse in our comprehension, that we can see neither wit nor ability in the contents of the Household Words. It is a silly concern to make the best of it.

The International Magazine, for January appears upon our table through the politeness of Messrs. Stringer & Townsend, the publishers. It contains a portrait of the celebrated Edmund Burke, his residences, and grave. The review of his life and character is from the pen of Mrs. S. C. Hall, and is elegantly written. The illustrations are well done—the typography excellent,—the paper finer than usual, and the contributions are each in themselves gems in literature of the highest order. This magazine is deserving a large circulation and we are happy to learn receives it. 144 pages; price per single number 25 cts. Published at 222 Broadway.

Woman and Her Diseases, from the Cradle to the Grave, adapted exclusively to her instruction in the Physiology of her System, by Dr. E. H. Dixon, Editor of the Scalpel. This is a work of over 300 pages, and has already passed through several editions. It has received the unqualified approbation of the most prominent journals in America. The editor treats each subject with great delicacy and clearness, and we do not hesitate to commend it to the careful attention of those to whom its contents are addressed.

We are indebted to Messrs. Fowler's Wells, 131 Nassau street, for a copy of Dr. Combe's Lectures upon Phrenology. These Lectures were delivered in this country in the years 1838 and '39, and at that time attracted much attention. Several editions have been sold by the publishers, "and the cry is still they come." They are among the most valuable contributions to the science.

Wilsons Great Metropolis, for 1851, has just been issued by H. Wilson, No. 49 Ann street. It contains an almanac for the coming year, besides a valuable collection of important matter connected with the government and institutions of this city, illustrated by several engravings of its most prominent buildings and a map of the streets.

MECHANICS

INVENTORS
AND
MANUFACTURERS.

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The Publishers of the SCIENTIFIC AMERICAN respectfully give notice that the Sixth Volume of this valuable journal, commenced on the 21st of September last. The character of the Scientific American is too well known throughout the country to require a detailed account of the various subjects discussed through its columns.

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Any person sending us three subscribers will be entitled to a copy of the "History of Propellers and Steam Navigation," re-published in book form—having first appeared in a series of articles published in the fifth Volume of the Scientific American. It is one of the most complete works upon the subject ever issued, and contains about ninety engravings—price 75 cents.